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HERRING

- the 'Golden Goose' of the Sea

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Of all the living resources of the world's oceans none approaches the *Clupeidae* (herring and herring-like fishes) in overall importance and value. They are the most abundant of the fishes, and the history of their fisheries goes back at least to the third century A.D. Wars have been fought, laws have been enacted, nations have been established, and cities have been built as a direct consequence of herring fisheries. The civil war in Britain owed its origin to herring fisheries, since it was because of them that "ship money" was levied. The whole concept of "freedom of the seas" was an outcome of disputes over herring fisheries. The 3-mile limit for territorial waters was established to protect herring fisheries, and many national mercantile marines (the cradle for navies) grew out of them. The Netherlands became economically important and politically powerful because of herring fisheries, and it has been said that the foundations of Amsterdam were laid on herring bones.

The importance of this group of fishes is apparent in statistics published by the Food and Agriculture Organization of the United Nations. The world catch of herring and related species in 1967 amounted to nearly 20 million metric tons or almost 45 percent of the

total catch of all marine fishes (Figure 1). Large quantities are eaten by man. Even larger quantities are processed for animal food and hence consumed indirectly by man. However, their greatest value probably lies in the fact that they constitute the chief source

of food for most marine fishes and mammals.

The Atlantic herring (*Clupea harengus*) is the best known and most important of the herring family. Its distribution covers most of the con-

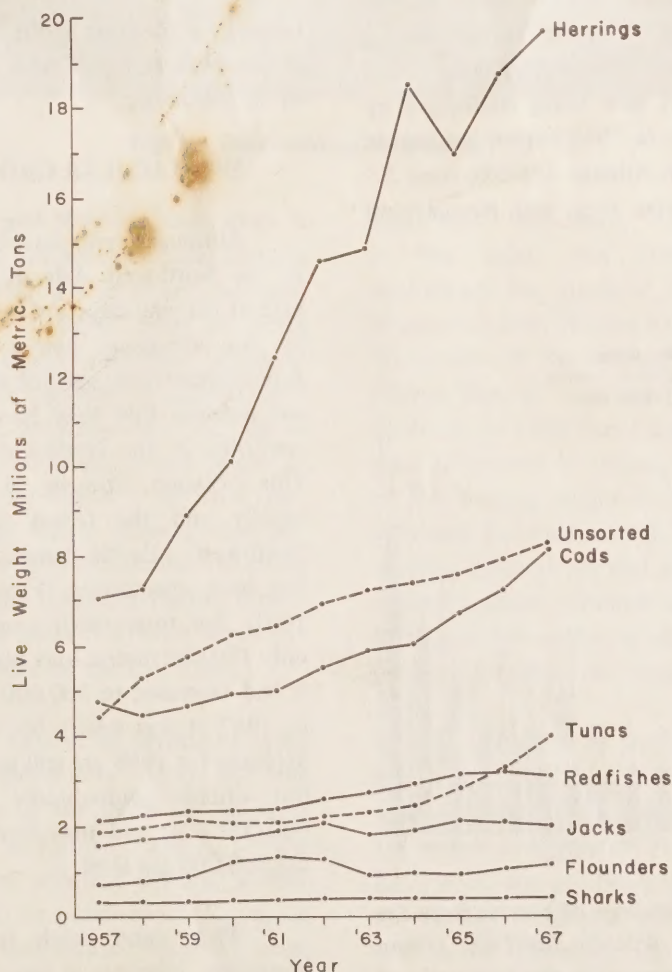


Fig. 1 - World catch of marine fishes 1957-67. (From FAO Yearbook of Fishery Statistics).

tinental shelf regions of the North Atlantic, and fisheries for it are probably as old as the earliest settlements of northwestern Europe. Historians differ somewhat in their accounts of these fisheries, but there is no doubt that the Danes carried on a major industry in herring products during the twelfth and thirteenth centuries, fishing in the Skagerrak, Kattegat, and Baltic. The Dutch became the most important fishing nation in Europe during the sixteenth and seventeenth centuries, taking most of their catch from the North Sea. The British established their first deep-sea herring fishery in the early 1800's and soon ousted the Dutch from their dominant position. Subsequently, Norway, Iceland, and the Faeroes became the leaders in European fisheries. The Scandinavian countries are still the most important herring fishing nations of Europe, although their position is now being challenged by the USSR. In 1966 herring landings in the eastern Atlantic approximated 3.5 million metric tons, with Norway and

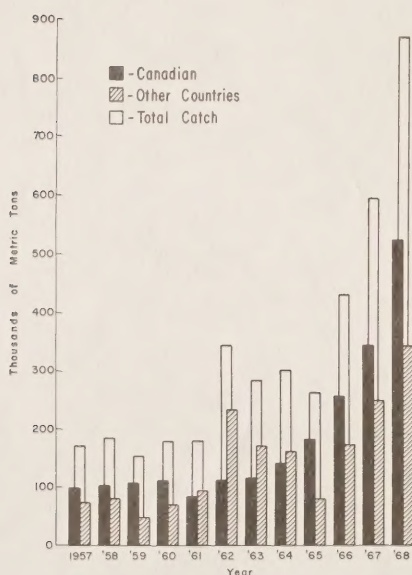


Fig. 2 — Landings of herring from the Northwest Atlantic 1957-68. (From statistics prepared by the International Commission for the Northwest Atlantic Fisheries).

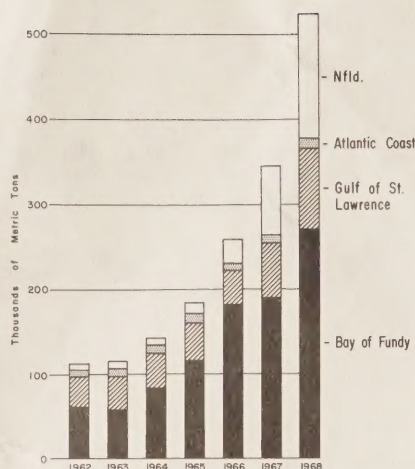


Fig. 3 — Canadian East Coast herring landings 1962-68. (From Fisheries Statistics of Canada, Dominion Bureau of Statistics).

Iceland contributing about 70 percent of the total and the USSR about half of the remainder.

SPECTACULAR GROWTH

Although herring have been fished in the Northwest Atlantic since the earliest colonial days and undoubtedly by the aborigines before that, the fisheries have never reached the important position that they have held for centuries in the Northeast Atlantic. This situation, however, is changing rapidly and the recent growth of Northwest Atlantic herring fisheries has been spectacular (Figure 2). In 1961, the total catch amounted to only 180,000 metric tons, but by 1964 it had increased to 300,000 tons, and in 1967 it was nearly 600,000 tons. Statistics for 1968 are still incomplete, but catches undoubtedly exceeded 860,000 tons and may have reached the 900,000 ton level.

While total catch figures are impressive, increases in some areas are even more so. The Georges Bank fishery, non-existent in 1960, account-

ed for nearly 300,000 tons in 1968. A new fishery which was started in the Banquereau area during the latter part of 1968 may well have taken more than 250,000 tons in the first full year of fishing. Landings from the southwest coastal regions of Newfoundland increased from 6,000 tons in 1961 to 145,000 tons in 1968. There were fivefold increases in both the Gulf of St. Lawrence and the Bay of Fundy where there were already major herring fisheries before the recent expansion.

The herring "gold rush" is on, and facilities for catching and processing herring are being built, converted, or transferred from other areas at an alarming rate. Canadian statistics confirm the changes that are taking place in the Canadian fishery. Reports of reconnaissance flights by the U.S. Coast Guard and lists of fishing vessels prepared by the International Commission for the Northwest Atlantic Fisheries both show that European fishing for herring in the Northwest Atlantic is increasing rapidly. More fishing vessels, more factory ships and

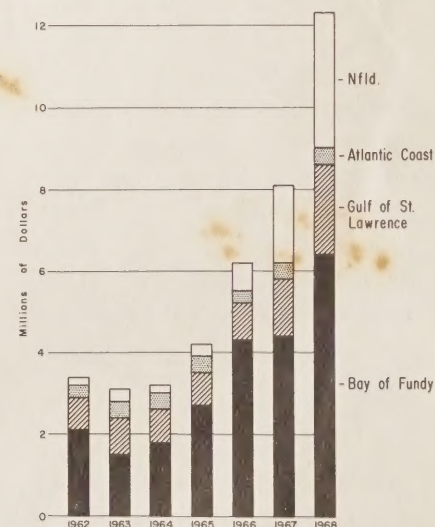


Fig. 4 — Landed values of East Coast herring landings 1962-68. (From Fisheries Statistics of Canada, Dominion Bureau of Statistics).

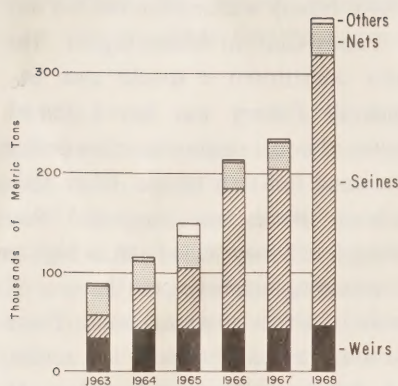


Fig. 5 — Landings of herring by types of gear (Maritimes only) 1963-68. (Dominion Bureau of Statistics Special Tabulation).

more nations are becoming involved each year and unless there is improvement in eastern Atlantic and eastern Pacific herring fisheries this trend is apt to continue.

A brief look at some Canadian statistics will establish the national interest in the east coast herring fishery and demonstrate the need for concern about the future. Landings by major fishing areas for the years 1962 to 1968 are shown in Figure 3. The largest increases occurred in the Bay

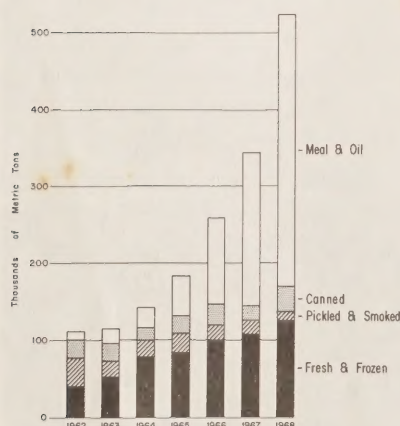


Fig. 6 — Utilization of East Coast herring catches 1962-68. (From Fisheries Statistics of Canada, Dominion Bureau of Statistics).



Fig. 7 — Purse seining for herring.

of Fundy and Newfoundland areas. A significant but less spectacular increase took place in the Gulf of St. Lawrence. Along the Atlantic coast of Nova Scotia landings remained relatively stable. The increase in landed value (Figure 4) paralleled the increase in catch, and it hardly needs emphasis that, at more than \$12 million a year, the herring fishery plays a most important part in the economic well-being of East Coast fishermen. Herring is now the second (after cod) most important fin fish landed on the East Coast.

The catches of herring by types of gear (Maritimes only) and the utilization of the catch for all areas are given in Figures 5 and 6. The use of modern, efficient catching techniques, such as purse-seines (Figure 7) and midwater trawls (Figure 8), made the increase in landings possible. Traditional fishing methods, such as weirs (Figure 9), stop-seines and gill-

nets still contribute significantly to the catch, but their relative importance has declined drastically. Whereas in 1962 (Figure 6) more than 90 percent of the herring landed in eastern Canada were used for food products, in 1968 this figure was less than 33 percent. More than 66 percent of the herring caught in 1968 were processed for meal and oil — a far less valuable product per unit weight than canned sardines, smoked and pickled herring, or any number of other herring products for direct use by man.

There seems to be little doubt that prior to 1960 most of the North-western Atlantic herring stocks (Figure 10) were underfished. The Georges Bank stock was not being harvested at all. Fishing levels for stocks in the Gulf of St. Lawrence and along the south and west coasts of Newfoundland were estimated (calculated for the Chaleur Bay area) to be less than 10



Fig. 8 — Midwater trawling for herring.

percent annually, and the only intensive fishery was centered in the Bay of Fundy-Gulf of Maine region. The latter constituted a special case because its fishery was based almost exclusively on a single year-class during its second full year of life. What little evidence there was suggested that fishing levels may have been as high as 50 percent, but little was known of survival to the spawning stage. There was only a token fishery for adults, and the recruitment potential could only be guessed at.

AT DANGER POINT?

The recent rate of increase in Northwest Atlantic herring landings cannot continue indefinitely, and even now we may be in the danger area. The "golden goose" is a "sitting duck" and needs protection. The present expansion tendencies should not be allowed to continue unchecked. Industry as well as management, both nationally and internationally, might



Fig. 9 — A typical herring weir in Charlotte County, New Brunswick.

be well advised to adopt a policy of consolidating the present position before making plans for the future.

How can we protect herring stocks so that all people can enjoy and profit from them in the years to come? Obviously we cannot do this without sufficient knowledge to provide a sound basis for management and such knowledge is not available now. But we do know what the problems are and what questions must be answered for rational exploitation and maximum economic benefit.

One of the most important problems that must be solved is whether the herring stock is a single, widely distributed population or whether it is divided into a number of separate units which intermingle to a limited extent, if at all. An answer to this question is essential for any study of the vital statistics of fish populations, since management policies may have to be as diverse for unit stocks of the same species as they are for different species.

There is a large library of information concerning the natural history of herring in Canadian waters, and we are well versed in such things as size, age, growth, spawning, food, behaviour, digestion, fatness, enemies, and disease. However, we are lacking information on recruitment and mortality rates; and the identity, characteristics, distribution, and relationships of unit stocks need to be defined more precisely.

NO QUICK ANSWERS

Unfortunately, there are no quick answers to many of the questions involved in the assessment, and the effects of overfishing may not be apparent until it is too late to correct it. The earliest symptoms are decreases in the average size and age of herring

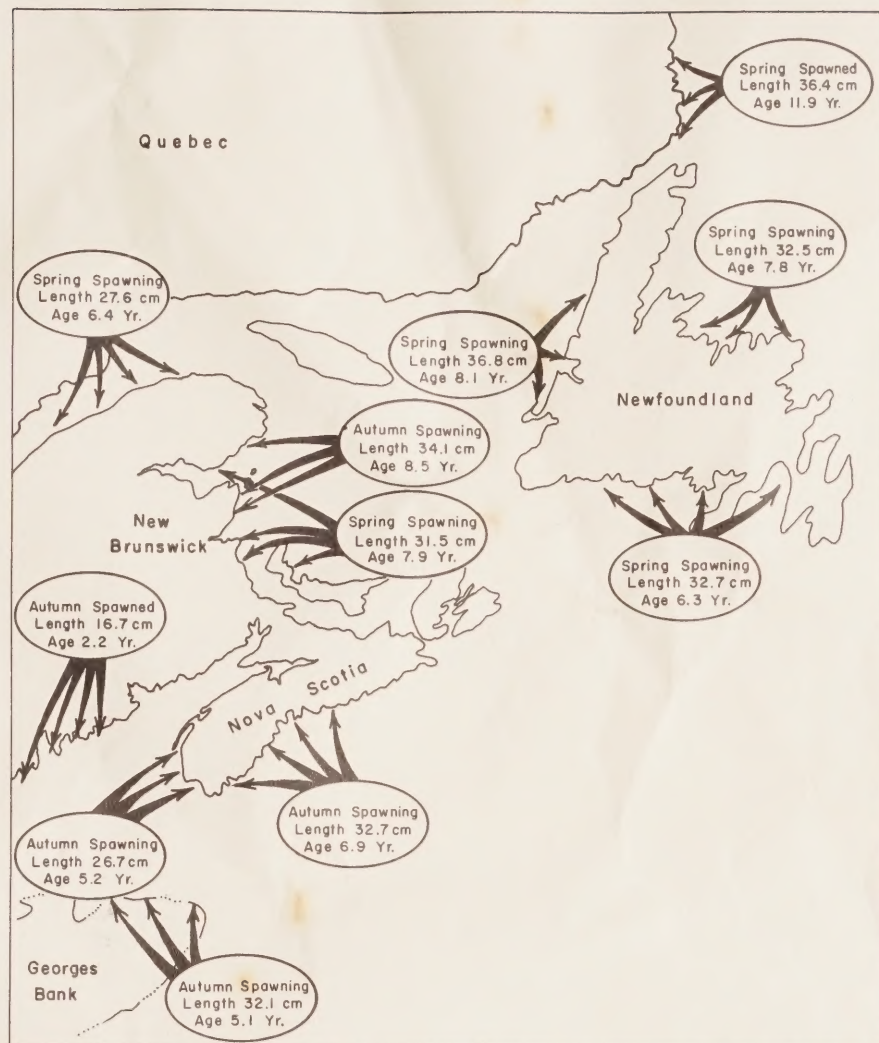


Fig. 10 — Herring stocks in the Northwest Atlantic. Spawning types, mean sizes and ages. (Information from various sources and not necessarily reflecting current or unanimous expert opinion).

and in catch per unit of effort. Long-term effects will be the reduction of parent stocks to the point where too few young are produced each year to ensure survival.

There is a fallacy in the popular belief that resources of herring are inexhaustible. The success of natural reproduction varies tremendously. Schooling behaviour, particularly at spawning times and in the winter months, makes them exceedingly vulnerable to overfishing. The decline in herring and other clupeid fisheries can be just as spectacular as their

growth. This has already happened in areas such as the Icelandic waters, the west coast of Canada, and in the North and Norwegian Seas. It may be imminent in others, such as in the anchovy fishery off the coasts of Peru and Chile.

The present situation is grave and demands the immediate attention of all concerned. Industry, management, and research must cooperate to provide the best answers in the shortest time. Our "golden goose" is still alive. Let's make sure she stays healthy and productive!



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